

## High-Flux Ultracold-Atom Chip Interferometers, Phase II

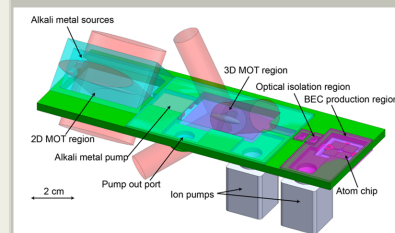
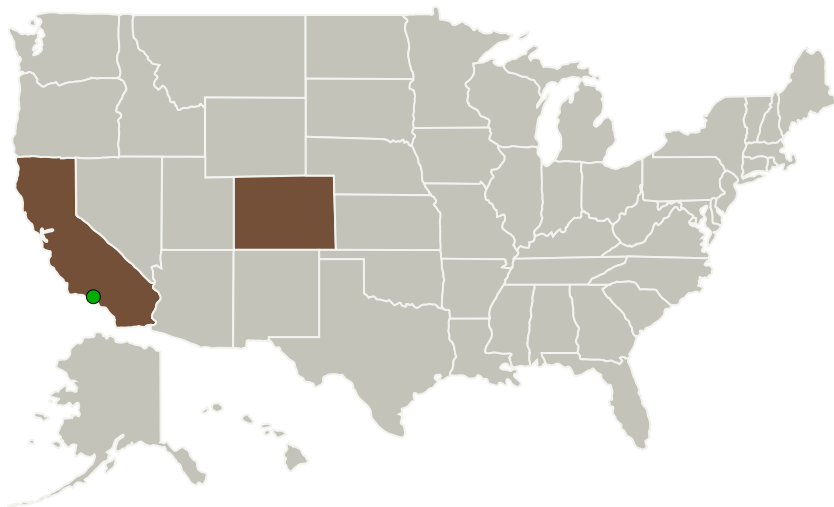
Completed Technology Project (2014 - 2017)



## Project Introduction

ColdQuanta's ultimate objective is to produce a compact, turnkey, ultracold-atom system specifically designed for performing interferometry with Bose-Einstein condensates. In Phase II, we propose to develop an ultracold-atom system based on ColdQuanta's channel cell technology. With this approach to ultrahigh-vacuum systems, we can design and fabricate cells that are far smaller and more robust than any other vacuum technology used with ultracold atoms (of which we are aware). With a channel cell, each stage of BEC production can occur simultaneously throughout a series of interconnected vacuum chambers. The resulting system creates ultracold atoms quasi-continuously and increases production rates by virtually eliminating dead time between sequential operating cycles. Part of the channel cell's small size is due to an integrated atom microchip that can be used to quickly produce ultracold atoms and utilize them for a variety of applications. With the flexibility afforded by atom chips, channel cells can be easily configured for a variety of interferometer geometries, including a Michelson configuration for measuring accelerations and a Sagnac configuration for measuring rotations.

## Primary U.S. Work Locations and Key Partners



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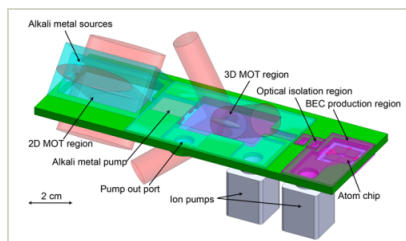


Organizations Performing Work	Role	Type	Location
ColdQuanta, Inc.	Lead Organization	Industry	Boulder, Colorado
● Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

## Primary U.S. Work Locations

California	Colorado
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## Images



## Briefing Chart Image

High-Flux Ultracold-Atom Chip  
Interferometers, Phase II

(<https://techport.nasa.gov/image/126241>)

## Organizational Responsibility

## Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

## Lead Organization:

ColdQuanta, Inc.

## Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

## Program Director:

Jason L Kessler

## Program Manager:

Carlos Torrez

## Principal Investigator:

Daniel M Farkas

## Co-Investigator:

Daniel Farkas

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### Technology Maturity (TRL)

Start: **2**  
Current: **3**  
Estimated End: **3**



### Technology Areas

#### Primary:

- TX08 Sensors and Instruments
  - └ TX08.1 Remote Sensing Instruments/Sensors
    - └ TX08.1.1 Detectors and Focal Planes

### Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System